

I. PROJECT PLANNING (21%) - This area assesses the candidate's ability to conduct a preliminary evaluation of geologic and environmental hazards, including developing an approach to manage the project and determining the feasibility of the project.

<i>Job Task</i>	<i>Associated Knowledge</i>
T1. Conduct areal reconnaissance to evaluate potential geologic impacts and constraints on site exploration.	K65. Knowledge of geologic and geomorphic conditions depicted in topographic and geologic maps. K25. Knowledge of capabilities of different drilling and trenching equipment. K87. Knowledge of sources of published and unpublished geologic maps and raw data. K96. Knowledge of sources of published and unpublished topographic maps. K92. Knowledge of sources of published and unpublished geotechnical reports. K123. Knowledge of techniques to read design information in grading plans. K47. Knowledge of effects of physical changes to the ground surface depicted on grading plans. K83. Knowledge of sources for published and unpublished imagery and photographs. K60. Knowledge of field evidence of land modifications and past use. K38. Knowledge of effects of historical land uses on current site condition. K34. Knowledge of methods to construct site access.
T6. Define scope of engineering geologic investigation based on preliminary review of geologic data.	K65. Knowledge of geologic and geomorphic conditions depicted in topographic and geologic maps. K87. Knowledge of sources of published and unpublished geologic maps and raw data. K96. Knowledge of sources of published and unpublished topographic maps. K92. Knowledge of sources of published and unpublished geotechnical reports. K123. Knowledge of techniques to read design information in grading plans. K42. Knowledge of effects of local requirements on engineering geologic studies and reports. K47. Knowledge of effects of physical changes to the ground surface depicted on grading plans. K83. Knowledge of sources for published and unpublished imagery and photographs. K38. Knowledge of effects of historical land uses on current site condition.

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<i>Job Task</i>	<i>Associated Knowledge</i>
T10. Identify geologic conditions that could impact site development based on review of published and unpublished geologic data.	<p>K65. Knowledge of geologic and geomorphic conditions depicted in topographic and geologic maps.</p> <p>K87. Knowledge of sources of published and unpublished geologic maps and raw data.</p> <p>K96. Knowledge of sources of published and unpublished topographic maps.</p> <p>K92. Knowledge of sources of published and unpublished geotechnical reports.</p> <p>K47. Knowledge of effects of physical changes to the ground surface depicted on grading plans.</p> <p>K83. Knowledge of sources for published and unpublished imagery and photographs.</p> <p>K60. Knowledge of field evidence of land modifications and past use.</p> <p>K38. Knowledge of effects of historical land uses on current site condition.</p>
T14. Identify physical and chemical laboratory tests to characterize earth materials.	<p>K1. Knowledge of advantages and disadvantages of sampling and testing methods to evaluate engineering properties of earth materials.</p> <p>K92. Knowledge of sources of published and unpublished geotechnical reports.</p> <p>K123. Knowledge of techniques to read design information in grading plans.</p> <p>K47. Knowledge of effects of physical changes to the ground surface depicted on grading plans.</p> <p>K60. Knowledge of field evidence of land modifications and past use.</p> <p>K51. Knowledge of environmental and safety regulations pertaining to exploration and sampling of contaminated soil and groundwater.</p> <p>K76. Knowledge of methods of relative dating of soils.</p>
T18. Identify potential physical hazards related to drilling or trenching activities.	<p>K25. Knowledge of capabilities of different drilling and trenching equipment.</p> <p>K74. Knowledge of safety hazards associated with subsurface exploration.</p> <p>K119. Knowledge of state regulations to safeguard personnel engaged in excavations, trenches, and earthwork.</p> <p>K56. Knowledge of federal regulations for safeguarding personnel engaged in excavations, trenches, and earthwork.</p> <p>K69. Knowledge of regulatory requirements for permitting, construction and abandonment of exploratory borings and wells.</p> <p>K51. Knowledge of environmental and safety regulations pertaining to exploration and sampling of contaminated soil and groundwater.</p> <p>K78. Knowledge of safety hazards associated with underground construction.</p>
T22. Identify regulatory permits and requirements for field exploration.	<p>K74. Knowledge of safety hazards associated with subsurface exploration.</p> <p>K119. Knowledge of state regulations to safeguard personnel engaged in excavations, trenches, and earthwork.</p> <p>K56. Knowledge of federal regulations for safeguarding personnel engaged in excavations, trenches, and earthwork.</p> <p>K42. Knowledge of effects of local requirements on engineering geologic studies and reports.</p> <p>K69. Knowledge of regulatory requirements for permitting, construction and abandonment of exploratory borings and wells.</p> <p>K51. Knowledge of environmental and safety regulations pertaining to exploration and sampling of contaminated soil and groundwater.</p> <p>K34. Knowledge of methods to construct site access.</p>

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<i>Job Task</i>	<i>Associated Knowledge</i>
T26. Review grading plans to evaluate potential impacts from adverse geologic conditions.	<p>K65. Knowledge of geologic and geomorphic conditions depicted in topographic and geologic maps.</p> <p>K87. Knowledge of sources of published and unpublished geologic maps and raw data.</p> <p>K96. Knowledge of sources of published and unpublished topographic maps.</p> <p>K92. Knowledge of sources of published and unpublished geotechnical reports.</p> <p>K123. Knowledge of techniques to read design information in grading plans.</p> <p>K47. Knowledge of effects of physical changes to the ground surface depicted on grading plans.</p> <p>K60. Knowledge of field evidence of land modifications and past use.</p> <p>K38. Knowledge of effects of historical land uses on current site condition.</p> <p>K105. Knowledge of state guidelines pertaining to setbacks of structures near active faults.</p> <p>K13. Knowledge of building codes pertaining to grading and seismicity requirements that affect local jurisdictions.</p> <p>K33. Knowledge of effect of local guidelines on setbacks for structures near active faults.</p> <p>K5. Knowledge of building codes pertaining to earthquake design.</p> <p>K101. Knowledge of state guidelines for siting schools, hospitals, and landfills.</p>
T30. Review site conditions and past site usage to determine presence of hazardous materials.	<p>K65. Knowledge of geologic and geomorphic conditions depicted in topographic and geologic maps.</p> <p>K87. Knowledge of sources of published and unpublished geologic maps and raw data.</p> <p>K96. Knowledge of sources of published and unpublished topographic maps.</p> <p>K83. Knowledge of sources for published and unpublished imagery and photographs.</p> <p>K60. Knowledge of field evidence of land modifications and past use.</p> <p>K38. Knowledge of effects of historical land uses on current site condition.</p>
T34. Select exploration techniques to describe and evaluate surface and subsurface conditions.	<p>K25. Knowledge of capabilities of different drilling and trenching equipment.</p> <p>K1. Knowledge of advantages and disadvantages of sampling and testing methods to evaluate engineering properties of earth materials.</p> <p>K69. Knowledge of regulatory requirements for permitting, construction and abandonment of exploratory borings and wells.</p> <p>K51. Knowledge of environmental and safety regulations pertaining to exploration and sampling of contaminated soil and groundwater.</p> <p>K34. Knowledge of methods to construct site access.</p> <p>K76. Knowledge of methods of relative dating of soils.</p>
T38. Select locations and depths for subsurface exploration and sampling.	<p>K65. Knowledge of geologic and geomorphic conditions depicted in topographic and geologic maps.</p> <p>K25. Knowledge of capabilities of different drilling and trenching equipment.</p> <p>K87. Knowledge of sources of published and unpublished geologic maps and raw data.</p> <p>K96. Knowledge of sources of published and unpublished topographic maps.</p> <p>K42. Knowledge of effects of local requirements on engineering geologic studies and reports.</p> <p>K83. Knowledge of sources for published and unpublished imagery and photographs.</p> <p>K60. Knowledge of field evidence of land modifications and past use.</p> <p>K69. Knowledge of regulatory requirements for permitting, construction and abandonment of exploratory borings and wells.</p> <p>K38. Knowledge of effects of historical land uses on current site condition.</p> <p>K34. Knowledge of methods to construct site access.</p>

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<i>Job Task</i>	<i>Associated Knowledge</i>
T78. Prepare cross-sections to depict profile of existing and proposed development.	K123. Knowledge of techniques to read design information in grading plans. K47. Knowledge of effects of physical changes to the ground surface depicted on grading plans.

II. DATA COLLECTION (19%) – This area assesses the candidate’s ability to conduct field reconnaissance and subsurface exploration, including collecting geologic and hydrogeologic samples and determining their physical and chemical properties.

<i>Subarea</i>	<i>Job Task</i>	<i>Associated Knowledge</i>
A. MAP AND RECORD DATA (11%)	T15. Identify areas of collapsible, compressive, and expansive soils.	K10. Knowledge of field measurement techniques and tools to collect geologic data. K93. Knowledge of standardized soil classification systems. K43. Knowledge of methods to depict engineering geologic conditions on maps. K79. Knowledge of sampling and testing methods to evaluate engineering properties of soil and rock. K128. Knowledge of laboratory tests to evaluate geotechnical properties of earth materials. K52. Knowledge of methods to describe lithologic and pedologic properties of earth materials. K26. Knowledge of methods for in-situ testing of physical characteristics of earth materials. K75. Knowledge of sampling and testing methods to evaluate chemical properties of soil and rock.
	T23. Identify areas of subsidence.	K10. Knowledge of field measurement techniques and tools to collect geologic data. K43. Knowledge of methods to depict engineering geologic conditions on maps. K79. Knowledge of sampling and testing methods to evaluate engineering properties of soil and rock. K128. Knowledge of laboratory tests to evaluate geotechnical properties of earth materials. K26. Knowledge of methods for in-situ testing of physical characteristics of earth materials. K18. Knowledge of measurement techniques to assess ground movement. K127. Knowledge of physical and chemical weathering processes.
	T27. Log geology and engineering properties of earth materials in exploratory excavations.	K10. Knowledge of field measurement techniques and tools to collect geologic data. K93. Knowledge of standardized soil classification systems. K48. Knowledge of methods to describe geologic structures. K102. Knowledge of techniques to log exploratory trenches and large-diameter borings. K52. Knowledge of methods to describe lithologic and pedologic properties of earth materials. K57. Knowledge of methods to mitigate hazards associated with logging trenches and downhole logging of large-diameter borings. K88. Knowledge of standardized rock classification systems. K26. Knowledge of methods for in-situ testing of physical characteristics of earth materials. K22. Knowledge of methods for determining relative age of geomorphic features. K84. Knowledge of soil pedogenesis for interpretation of subsurface conditions. K127. Knowledge of physical and chemical weathering processes.
	T31. Log soil stratigraphy in paleoseismic trenches.	K10. Knowledge of field measurement techniques and tools to collect geologic data. K93. Knowledge of standardized soil classification systems. K48. Knowledge of methods to describe geologic structures. K102. Knowledge of techniques to log exploratory trenches and large-diameter borings. K52. Knowledge of methods to describe lithologic and pedologic properties of earth materials. K57. Knowledge of methods to mitigate hazards associated with logging trenches and downhole logging of large-diameter borings. K88. Knowledge of standardized rock classification systems. K22. Knowledge of methods for determining relative age of geomorphic features. K84. Knowledge of soil pedogenesis for interpretation of subsurface conditions. K127. Knowledge of physical and chemical weathering processes.

II. DATA COLLECTION (19%) – This area assesses the candidate’s ability to conduct field reconnaissance and subsurface exploration, including collecting geologic and hydrogeologic samples and determining their physical and chemical properties.

<i>Subarea</i>	<i>Job Task</i>	<i>Associated Knowledge</i>
A. MAP AND RECORD DATA (continued)	T35. Map geomorphology, lithology, and geologic structures from surface exposures.	K10. Knowledge of field measurement techniques and tools to collect geologic data. K43. Knowledge of methods to depict engineering geologic conditions on maps. K48. Knowledge of methods to describe geologic structures. K52. Knowledge of methods to describe lithologic and pedologic properties of earth materials. K22. Knowledge of methods for determining relative age of geomorphic features. K106. Knowledge of techniques to obtain and use topographic and geologic data in Geographic Information System format. K127. Knowledge of physical and chemical weathering processes.
	T65. Identify age of past rupture events.	K10. Knowledge of field measurement techniques and tools to collect geologic data. K102. Knowledge of techniques to log exploratory trenches and large-diameter borings. K52. Knowledge of methods to describe lithologic and pedologic properties of earth materials. K22. Knowledge of methods for determining relative age of geomorphic features. K18. Knowledge of measurement techniques to assess ground movement. K84. Knowledge of soil pedogenesis for interpretation of subsurface conditions. K127. Knowledge of physical and chemical weathering processes.
	T67. Describe type of faults, direction, and magnitude of displacement.	K48. Knowledge of methods to describe geologic structures. K102. Knowledge of techniques to log exploratory trenches and large-diameter borings. K22. Knowledge of methods for determining relative age of geomorphic features. K84. Knowledge of soil pedogenesis for interpretation of subsurface conditions. K127. Knowledge of physical and chemical weathering processes.
B. SAMPLE COLLECTION (5%)	T3. Collect groundwater samples for water quality or geochemical analysis.	K10. Knowledge of field measurement techniques and tools to collect geologic data. K120. Knowledge of the advantages and disadvantages of different methods to sample and test groundwater. K66. Knowledge of methods to sample and test groundwater chemistry.
	T7. Collect samples of soil and rock to represent subsurface conditions.	K10. Knowledge of field measurement techniques and tools to collect geologic data. K79. Knowledge of sampling and testing methods to evaluate engineering properties of soil and rock. K128. Knowledge of laboratory tests to evaluate geotechnical properties of earth materials. K75. Knowledge of sampling and testing methods to evaluate chemical properties of soil and rock. K115. Knowledge of tests to assess performance and durability of rock and aggregate materials. K97. Knowledge of techniques to collect Global Positioning System survey data.
	T45. Select soil, rock, water, or gas samples for physical and chemical laboratory testing.	K79. Knowledge of sampling and testing methods to evaluate engineering properties of soil and rock. K128. Knowledge of laboratory tests to evaluate geotechnical properties of earth materials. K14. Knowledge of laboratory tests to evaluate hydrogeologic properties of earth materials. K75. Knowledge of sampling and testing methods to evaluate chemical properties of soil and rock. K120. Knowledge of the advantages and disadvantages of different methods to sample and test groundwater. K66. Knowledge of methods to sample and test groundwater chemistry. K115. Knowledge of tests to assess performance and durability of rock and aggregate materials.

III. GEOLOGIC EVALUATION (35%) – This area assesses the candidate’s ability to identify and interpret geologic and hydrogeologic conditions and potential hazards or effects.

<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
C. Test Data (3%)	T11. Conduct hydrogeologic testing to measure aquifer characteristics.	K10. Knowledge of field measurement techniques and tools to collect geologic data. K14. Knowledge of laboratory tests to evaluate hydrogeologic properties of earth materials. K120. Knowledge of the advantages and disadvantages of different methods to sample and test groundwater. K66. Knowledge of methods to sample and test groundwater chemistry.
	T39. Measure physical and chemical properties of earth materials with in-situ tests.	K10. Knowledge of field measurement techniques and tools to collect geologic data. K79. Knowledge of sampling and testing methods to evaluate engineering properties of soil and rock. K26. Knowledge of methods for in-situ testing of physical characteristics of earth materials. K2. Knowledge of capabilities of different geophysical exploration methods. K75. Knowledge of sampling and testing methods to evaluate chemical properties of soil and rock. K115. Knowledge of tests to assess performance and durability of rock and aggregate materials.
	T42. Measure physical and chemical properties of earth materials with geophysical tests.	K79. Knowledge of sampling and testing methods to evaluate engineering properties of soil and rock. K26. Knowledge of methods for in-situ testing of physical characteristics of earth materials. K2. Knowledge of capabilities of different geophysical exploration methods.
A. EARTH MATERIALS AND SUBSURFACE CONDITIONS (12%)	T2. Prepare interpretive cross-sections to depict subsurface.	K39. Knowledge of methods to construct structure and groundwater contour maps. K30. Knowledge of methods to construct isopach maps. K98. Knowledge of methods to depict engineering geologic conditions in cross-sections. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K58. Knowledge of geometric relationship between apparent dip of geologic structures and slopes. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K107. Knowledge of methods to interpret geophysical data. K89. Knowledge of methods to construct stereonet for slope stability and discontinuity analysis.
	T28. Estimate rippability of rock materials to determine excavation methods.	K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K27. Knowledge of engineering properties of earth materials used in construction. K107. Knowledge of methods to interpret geophysical data.

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<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
	T48. Evaluate geologic structure, geomorphology, geologic hazards, and hydrogeology from published, unpublished, and field geologic data.	<p>K39. Knowledge of methods to construct structure and groundwater contour maps.</p> <p>K30. Knowledge of methods to construct isopach maps.</p> <p>K72. Knowledge of techniques to interpret aerial photographs.</p> <p>K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards.</p> <p>K15. Knowledge of different regional fault systems and tectonic frameworks.</p> <p>K58. Knowledge of geometric relationship between apparent dip of geologic structures and slopes.</p> <p>K19. Knowledge of effects of faults on site development.</p> <p>K67. Knowledge of influence of groundwater on slope stability.</p> <p>K11. Knowledge of conditions that affect groundwater flow.</p> <p>K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric.</p> <p>K62. Knowledge of geomorphic and field evidence of fault rupture.</p> <p>K80. Knowledge of methods to analyze slope stability.</p> <p>K35. Knowledge of field evidence of mass wasting processes.</p> <p>K31. Knowledge of field evidence of erosional and depositional processes.</p> <p>K53. Knowledge of geologic characteristics and processes of erosional environments.</p> <p>K85. Knowledge of methods to assess regional seismicity and tectonics.</p> <p>K103. Knowledge of methods to evaluate settlement potential.</p> <p>K3. Knowledge of the capabilities of different remote sensing methods used to interpret regional and site geology.</p> <p>K107. Knowledge of methods to interpret geophysical data.</p> <p>K112. Knowledge of methods to interpret remote sensing data.</p>
	T50. Evaluate geophysical survey results to interpret subsurface structure, stratigraphy or groundwater conditions.	<p>K58. Knowledge of geometric relationship between apparent dip of geologic structures and slopes.</p> <p>K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric.</p> <p>K107. Knowledge of methods to interpret geophysical data.</p> <p>K112. Knowledge of methods to interpret remote sensing data.</p>

III. GEOLOGIC EVALUATION (35%) – This area assesses the candidate’s ability to identify and interpret geologic and hydrogeologic conditions and potential hazards or effects.

<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
A. EARTH MATERIALS AND SUBSURFACE CONDITIONS (continued)	T60. Evaluate laboratory test results to estimate engineering geologic properties of earth materials.	K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K27. Knowledge of engineering properties of earth materials used in construction. K80. Knowledge of methods to analyze slope stability. K23. Knowledge of engineering factors that affect fill compaction and performance. K44. Knowledge of field methods to determine permeability. K103. Knowledge of methods to evaluate settlement potential. K121. Knowledge of procedures to evaluate earthquake ground motion parameters.
	T69. Describe distribution of primary and secondary faulting and fault related deformations.	K72. Knowledge of techniques to interpret aerial photographs. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K15. Knowledge of different regional fault systems and tectonic frameworks. K19. Knowledge of effects of faults on site development. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K62. Knowledge of geomorphic and field evidence of fault rupture. K81. Knowledge of techniques to mitigate impacts of gross and surficial slope instability. K36. Knowledge of state guidelines for fault evaluations. K85. Knowledge of methods to assess regional seismicity and tectonics.
	T72. Identify earth materials for use as construction materials.	K27. Knowledge of engineering properties of earth materials used in construction. K23. Knowledge of engineering factors that affect fill compaction and performance. K103. Knowledge of methods to evaluate settlement potential.

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<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
B. SLOPE STABILITY AND AS-GRADED CONSTRUCTION (9%)	T36. Evaluate effects of bluff instability and erosion along rivers and coastlines.	K72. Knowledge of techniques to interpret aerial photographs. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K67. Knowledge of influence of groundwater on slope stability. K11. Knowledge of conditions that affect groundwater flow. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K80. Knowledge of methods to analyze slope stability. K35. Knowledge of field evidence of mass wasting processes. K31. Knowledge of field evidence of erosional and depositional processes. K53. Knowledge of geologic characteristics and processes of erosional environments. K112. Knowledge of methods to interpret remote sensing data. K89. Knowledge of methods to construct stereonet for slope stability and discontinuity analysis.
	T43. Evaluate effects of erosional and depositional processes on natural and graded areas.	K72. Knowledge of techniques to interpret aerial photographs. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K80. Knowledge of methods to analyze slope stability. K35. Knowledge of field evidence of mass wasting processes. K31. Knowledge of field evidence of erosional and depositional processes. K53. Knowledge of geologic characteristics and processes of erosional environments. K112. Knowledge of methods to interpret remote sensing data.

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<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
B. SLOPE STABILITY AND AS-GRADED CONSTRUCTION (continued)	T52. Evaluate geologic factors affecting gross and surficial slope stability of natural and graded slopes.	K72. Knowledge of techniques to interpret aerial photographs. K98. Knowledge of methods to depict engineering geologic conditions in cross-sections. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K58. Knowledge of geometric relationship between apparent dip of geologic structures and slopes. K67. Knowledge of influence of groundwater on slope stability. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K81. Knowledge of techniques to mitigate impacts of gross and surficial slope instability. K80. Knowledge of methods to analyze slope stability. K35. Knowledge of field evidence of mass wasting processes. K85. Knowledge of methods to assess regional seismicity and tectonics. K40. Knowledge of field evidence of seismic shaking. K89. Knowledge of methods to construct stereonets for slope stability and discontinuity analysis.
	T54. Evaluate ground-movement monitoring and survey data for subsidence, settlement, and site stability.	K67. Knowledge of influence of groundwater on slope stability. K27. Knowledge of engineering properties of earth materials used in construction. K23. Knowledge of engineering factors that affect fill compaction and performance. K94. Knowledge of methods to control groundwater levels, flow, and seepage. K45. Knowledge of techniques for interpreting ground movement monitoring data. K103. Knowledge of methods to evaluate settlement potential. K99. Knowledge of techniques to mitigate impacts of land subsidence due to development.
	T64. Evaluate potential impact of subsidence on project site.	K72. Knowledge of techniques to interpret aerial photographs. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K11. Knowledge of conditions that affect groundwater flow. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K23. Knowledge of engineering factors that affect fill compaction and performance. K94. Knowledge of methods to control groundwater levels, flow, and seepage. K40. Knowledge of field evidence of seismic shaking. K45. Knowledge of techniques for interpreting ground movement monitoring data. K103. Knowledge of methods to evaluate settlement potential. K107. Knowledge of methods to interpret geophysical data. K112. Knowledge of methods to interpret remote sensing data.

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<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
B. SLOPE STABILITY AND AS-GRADED CONSTRUCTION (continued)	T68. Evaluate settlement due to site development.	K72. Knowledge of techniques to interpret aerial photographs. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K58. Knowledge of geometric relationship between apparent dip of geologic structures and slopes. K27. Knowledge of engineering properties of earth materials used in construction. K23. Knowledge of engineering factors that affect fill compaction and performance. K45. Knowledge of techniques for interpreting ground movement monitoring data. K103. Knowledge of methods to evaluate settlement potential.
	T77. Identify impact of development on stability of adjacent properties.	K72. Knowledge of techniques to interpret aerial photographs. K98. Knowledge of methods to depict engineering geologic conditions in cross-sections. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K58. Knowledge of geometric relationship between apparent dip of geologic structures and slopes. K19. Knowledge of effects of faults on site development. K67. Knowledge of influence of groundwater on slope stability. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K81. Knowledge of techniques to mitigate impacts of gross and surficial slope instability. K80. Knowledge of methods to analyze slope stability. K23. Knowledge of engineering factors that affect fill compaction and performance. K35. Knowledge of field evidence of mass wasting processes. K53. Knowledge of geologic characteristics and processes of erosional environments. K103. Knowledge of methods to evaluate settlement potential. K89. Knowledge of methods to construct stereonet for slope stability and discontinuity analysis.

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<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
C. GROUNDWATER CONDITIONS AND EFFECTS (5%)	T4. Analyze groundwater piezometric data to estimate gradient and flow direction.	K39. Knowledge of methods to construct structure and groundwater contour maps. K11. Knowledge of conditions that affect groundwater flow. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric.
	T8. Analyze hydrogeologic data to estimate aquifer characteristics.	K39. Knowledge of methods to construct structure and groundwater contour maps. K11. Knowledge of conditions that affect groundwater flow. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K44. Knowledge of field methods to determine permeability. K103. Knowledge of methods to evaluate settlement potential.
	T56. Evaluate groundwater chemical data for supply, quality, discharge, and contaminant studies.	K39. Knowledge of methods to construct structure and groundwater contour maps. K30. Knowledge of methods to construct isopach maps. K11. Knowledge of conditions that affect groundwater flow. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K94. Knowledge of methods to control groundwater levels, flow, and seepage.
	T58. Evaluate impact of natural and artificial water recharge on slope stability.	K67. Knowledge of influence of groundwater on slope stability. K11. Knowledge of conditions that affect groundwater flow. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K80. Knowledge of methods to analyze slope stability. K23. Knowledge of engineering factors that affect fill compaction and performance. K94. Knowledge of methods to control groundwater levels, flow, and seepage. K89. Knowledge of methods to construct stereonets for slope stability and discontinuity analysis.
	T76. Identify groundwater recharge and discharge areas from maps, imagery, and historic records for protection and management of groundwater resources.	K39. Knowledge of methods to construct structure and groundwater contour maps. K30. Knowledge of methods to construct isopach maps. K72. Knowledge of techniques to interpret aerial photographs. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K11. Knowledge of conditions that affect groundwater flow. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K44. Knowledge of field methods to determine permeability. K112. Knowledge of methods to interpret remote sensing data.

III. GEOLOGIC EVALUATION (35%) – This area assesses the candidate’s ability to identify and interpret geologic and hydrogeologic conditions and potential hazards or effects.

<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
D. SEISMIC CONDITIONS AND EFFECTS (9%)	T20. Estimate potential impact of tsunamis and seiche on project’s site.	K72. Knowledge of techniques to interpret aerial photographs. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K15. Knowledge of different regional fault systems and tectonic frameworks. K19. Knowledge of effects of faults on site development. K85. Knowledge of methods to assess regional seismicity and tectonics. K71. Knowledge of methods for deterministic and probabilistic seismic hazard analysis. K40. Knowledge of field evidence of seismic shaking. K121. Knowledge of procedures to evaluate earthquake ground motion parameters.
	T32. Evaluate effect of site conditions on seismic ground motion and site response.	K19. Knowledge of effects of faults on site development. K80. Knowledge of methods to analyze slope stability. K71. Knowledge of methods for deterministic and probabilistic seismic hazard analysis. K40. Knowledge of field evidence of seismic shaking. K121. Knowledge of procedures to evaluate earthquake ground motion parameters.
	T46. Evaluate fault surface rupture hazard based on paleoseismic and historic evidence.	K72. Knowledge of techniques to interpret aerial photographs. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K15. Knowledge of different regional fault systems and tectonic frameworks. K19. Knowledge of effects of faults on site development. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K62. Knowledge of geomorphic and field evidence of fault rupture. K36. Knowledge of state guidelines for fault evaluations. K125. Knowledge of state guidelines for evaluating seismic hazards. K85. Knowledge of methods to assess regional seismicity and tectonics. K40. Knowledge of field evidence of seismic shaking. K121. Knowledge of procedures to evaluate earthquake ground motion parameters. K112. Knowledge of methods to interpret remote sensing data.
	T62. Evaluate liquefaction susceptibility of project site.	K125. Knowledge of state guidelines for evaluating seismic hazards. K40. Knowledge of field evidence of seismic shaking. K121. Knowledge of procedures to evaluate earthquake ground motion parameters.

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<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
D. SEISMIC CONDITIONS AND EFFECTS (continued)	T66. Evaluate seismic stability of natural and graded slopes.	K72. Knowledge of techniques to interpret aerial photographs. K15. Knowledge of different regional fault systems and tectonic frameworks. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K27. Knowledge of engineering properties of earth materials used in construction. K62. Knowledge of geomorphic and field evidence of fault rupture. K80. Knowledge of methods to analyze slope stability. K85. Knowledge of methods to assess regional seismicity and tectonics. K71. Knowledge of methods for deterministic and probabilistic seismic hazard analysis. K40. Knowledge of field evidence of seismic shaking.
	T74. Identify geomorphic features on remote sensing images or aerial photographs that indicate areas of potential instability or fault activity.	K72. Knowledge of techniques to interpret aerial photographs. K49. Knowledge of fundamentals of geomorphology pertaining to geologic hazards. K15. Knowledge of different regional fault systems and tectonic frameworks. K19. Knowledge of effects of faults on site development. K7. Knowledge of characteristics of joints, fractures, shears, and rock fabric. K62. Knowledge of geomorphic and field evidence of fault rupture. K35. Knowledge of field evidence of mass wasting processes. K31. Knowledge of field evidence of erosional and depositional processes. K53. Knowledge of geologic characteristics and processes of erosional environments. K85. Knowledge of methods to assess regional seismicity and tectonics. K3. Knowledge of the capabilities of different remote sensing methods used to interpret regional and site geology. K112. Knowledge of methods to interpret remote sensing data.

IV. DESIGN AND CONSTRUCTION (25%) – This area assesses the candidate’s ability to develop recommendations for site design, grading, remediation, and construction; to evaluate conformance to design specifications; and, to document and report as-built/as-graded conditions, including postconstruction monitoring.

<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
A. GRADING, CONSTRUCTION AND REMEDIAL PLAN DEVELOPMENT (11%)	T5. Design excavations for remedial grading.	<p>K124. Knowledge of the effect of rock properties on excavation methods.</p> <p>K63. Knowledge of techniques for retaining wall construction.</p> <p>K20. Knowledge of landslide mechanics.</p> <p>K16. Knowledge of grading and excavation techniques.</p> <p>K12. Knowledge of geologic factors that affect various foundation types.</p> <p>K126. Knowledge of techniques to mitigate impacts of slope instability.</p> <p>K86. Knowledge of techniques to address unforeseen geologic conditions during construction.</p> <p>K46. Knowledge of methods to construct cut and fill slopes.</p> <p>K28. Knowledge of methods for construction and slope dewatering.</p> <p>K100. Knowledge of techniques to mitigate effects of seismic slope instability.</p> <p>K118. Knowledge of techniques to mitigate impacts of expansive soils.</p> <p>K24. Knowledge of methods and materials for soil reinforcement.</p> <p>K55. Knowledge of methods to mitigate impact of compressible soils.</p> <p>K95. Knowledge of techniques to mitigate bluff instability and erosion along rivers and coastlines.</p> <p>K64. Knowledge of methods to remediate contaminated soil.</p> <p>K109. Knowledge of techniques to mitigate impacts of collapsible soils.</p> <p>K59. Knowledge of methods to mitigate impact of corrosive soils.</p>
	T9. Design groundwater monitoring systems to evaluate seepage, permeability, seasonal fluctuation, construction dewatering, and groundwater quality.	<p>K6. Knowledge of effects of corrosive water and soil on engineered structures.</p> <p>K116. Knowledge of methods to remediate contaminated groundwater.</p> <p>K28. Knowledge of methods for construction and slope dewatering.</p> <p>K50. Knowledge of methods to develop groundwater monitoring wells.</p> <p>K4. Knowledge of applications for different geotextiles and geofabrics.</p> <p>K37. Knowledge of methods for onsite sewage disposal.</p>

IV. DESIGN AND CONSTRUCTION (25%) – This area assesses the candidate’s ability to develop recommendations for site design, grading, remediation, and construction; to evaluate conformance to design specifications; and, to document and report as-built/as-graded conditions, including postconstruction monitoring.

<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
A. GRADING, CONSTRUCTION AND REMEDIAL PLAN DEVELOPMENT (continued)	T17. Design of slope stabilization dewatering systems.	<p>K6. Knowledge of effects of corrosive water and soil on engineered structures.</p> <p>K20. Knowledge of landslide mechanics.</p> <p>K16. Knowledge of grading and excavation techniques.</p> <p>K12. Knowledge of geologic factors that affect various foundation types.</p> <p>K126. Knowledge of techniques to mitigate impacts of slope instability.</p> <p>K46. Knowledge of methods to construct cut and fill slopes.</p> <p>K28. Knowledge of methods for construction and slope dewatering.</p> <p>K50. Knowledge of methods to develop groundwater monitoring wells.</p> <p>K41. Knowledge of methods of rock slope stabilization.</p> <p>K32. Knowledge of methods for in-place ground improvement.</p> <p>K95. Knowledge of techniques to mitigate bluff instability and erosion along rivers and coastlines.</p>
	T21. Design remedial action plan for contaminated soil and groundwater.	<p>K124. Knowledge of the effect of rock properties on excavation methods.</p> <p>K6. Knowledge of effects of corrosive water and soil on engineered structures.</p> <p>K70. Knowledge of potential for mineral alteration to affect engineered projects.</p> <p>K116. Knowledge of methods to remediate contaminated groundwater.</p> <p>K16. Knowledge of grading and excavation techniques.</p> <p>K126. Knowledge of techniques to mitigate impacts of slope instability.</p> <p>K46. Knowledge of methods to construct cut and fill slopes.</p> <p>K28. Knowledge of methods for construction and slope dewatering.</p> <p>K50. Knowledge of methods to develop groundwater monitoring wells.</p> <p>K4. Knowledge of applications for different geotextiles and geofabrics.</p> <p>K32. Knowledge of methods for in-place ground improvement.</p> <p>K64. Knowledge of methods to remediate contaminated soil.</p>

IV. DESIGN AND CONSTRUCTION (25%) – This area assesses the candidate’s ability to develop recommendations for site design, grading, remediation, and construction; to evaluate conformance to design specifications; and, to document and report as-built/as-graded conditions, including postconstruction monitoring.

<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
A. GRADING, CONSTRUCTION AND REMEDIAL PLAN DEVELOPMENT (continued)	T41. Evaluate quantity and quality of earth materials used in construction.	<p>K124. Knowledge of the effect of rock properties on excavation methods.</p> <p>K6. Knowledge of effects of corrosive water and soil on engineered structures.</p> <p>K61. Knowledge of methods to mitigate impact of organic soils.</p> <p>K70. Knowledge of potential for mineral alteration to affect engineered projects.</p> <p>K63. Knowledge of techniques for retaining wall construction.</p> <p>K16. Knowledge of grading and excavation techniques.</p> <p>K12. Knowledge of geologic factors that affect various foundation types.</p> <p>K46. Knowledge of methods to construct cut and fill slopes.</p> <p>K118. Knowledge of techniques to mitigate impacts of expansive soils.</p> <p>K24. Knowledge of methods and materials for soil reinforcement.</p> <p>K4. Knowledge of applications for different geotextiles and geofabrics.</p> <p>K32. Knowledge of methods for in-place ground improvement.</p> <p>K64. Knowledge of methods to remediate contaminated soil.</p> <p>K59. Knowledge of methods to mitigate impact of corrosive soils.</p>
	T59. Review grading and development plans to evaluate conformance with geologic recommendations.	<p>K29. Knowledge of codes pertaining to seismic safety elements that might affect local jurisdictions.</p> <p>K124. Knowledge of the effect of rock properties on excavation methods.</p> <p>K6. Knowledge of effects of corrosive water and soil on engineered structures.</p> <p>K61. Knowledge of methods to mitigate impact of organic soils.</p> <p>K70. Knowledge of potential for mineral alteration to affect engineered projects.</p> <p>K63. Knowledge of techniques for retaining wall construction.</p> <p>K16. Knowledge of grading and excavation techniques.</p> <p>K12. Knowledge of geologic factors that affect various foundation types.</p> <p>K46. Knowledge of methods to construct cut and fill slopes.</p> <p>K28. Knowledge of methods for construction and slope dewatering.</p> <p>K41. Knowledge of methods of rock slope stabilization.</p> <p>K4. Knowledge of applications for different geotextiles and geofabrics.</p> <p>K32. Knowledge of methods for in-place ground improvement.</p> <p>K37. Knowledge of methods for onsite sewage disposal.</p>

IV. DESIGN AND CONSTRUCTION (25%) – This area assesses the candidate’s ability to develop recommendations for site design, grading, remediation, and construction; to evaluate conformance to design specifications; and, to document and report as-built/as-graded conditions, including postconstruction monitoring.

<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
A. GRADING, CONSTRUCTION AND REMEDIAL PLAN DEVELOPMENT (continued)	T73. Establish setback distances of proposed structures from hazardous faults.	K29. Knowledge of codes pertaining to seismic safety elements that might affect local jurisdictions. K77. Knowledge of state guidelines for preparing engineering geologic studies and reports. K12. Knowledge of geologic factors that affect various foundation types. K73. Knowledge of relationship between strong ground shaking and slope stability.
	T75. Estimate degree of risk associated with surface and subsurface conditions.	K17. Knowledge of building codes pertaining to seismic zone tabulation. K61. Knowledge of methods to mitigate impact of organic soils. K70. Knowledge of potential for mineral alteration to affect engineered projects. K90. Knowledge of techniques to mitigate impacts of liquefaction. K20. Knowledge of landslide mechanics. K16. Knowledge of grading and excavation techniques. K12. Knowledge of geologic factors that affect various foundation types. K86. Knowledge of techniques to address unforeseen geologic conditions during construction. K28. Knowledge of methods for construction and slope dewatering. K118. Knowledge of techniques to mitigate impacts of expansive soils. K55. Knowledge of methods to mitigate impact of compressible soils. K64. Knowledge of methods to remediate contaminated soil.

IV. DESIGN AND CONSTRUCTION (25%) – This area assesses the candidate’s ability to develop recommendations for site design, grading, remediation, and construction; to evaluate conformance to design specifications; and, to document and report as-built/as-graded conditions, including postconstruction monitoring.

<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
B. GRADING OBSERVATION AND CONSTRUCTION MONITORING (7%)	T53. Identify potentially liquefiable soils.	K90. Knowledge of techniques to mitigate impacts of liquefaction. K12. Knowledge of geologic factors that affect various foundation types. K86. Knowledge of techniques to address unforeseen geologic conditions during construction. K122. Knowledge of techniques to mitigate impacts of secondary seismic hazards. K32. Knowledge of methods for in-place ground improvement.
	T55. Observe geologic conditions during grading and construction to assess conformance to expected conditions.	K124. Knowledge of the effect of rock properties on excavation methods. K61. Knowledge of methods to mitigate impact of organic soils. K70. Knowledge of potential for mineral alteration to affect engineered projects. K20. Knowledge of landslide mechanics. K16. Knowledge of grading and excavation techniques. K12. Knowledge of geologic factors that affect various foundation types. K86. Knowledge of techniques to address unforeseen geologic conditions during construction. K46. Knowledge of methods to construct cut and fill slopes. K28. Knowledge of methods for construction and slope dewatering. K118. Knowledge of techniques to mitigate impacts of expansive soils. K41. Knowledge of methods of rock slope stabilization. K24. Knowledge of methods and materials for soil reinforcement. K55. Knowledge of methods to mitigate impact of compressible soils. K4. Knowledge of applications for different geotextiles and geofabrics. K32. Knowledge of methods for in-place ground improvement. K95. Knowledge of techniques to mitigate bluff instability and erosion along rivers and coastlines. K64. Knowledge of methods to remediate contaminated soil. K109. Knowledge of techniques to mitigate impacts of collapsible soils. K59. Knowledge of methods to mitigate impact of corrosive soils.
	T63. Identify areas of hazardous faults on or adjacent to site.	K86. Knowledge of techniques to address unforeseen geologic conditions during construction. K100. Knowledge of techniques to mitigate effects of seismic slope instability. K122. Knowledge of techniques to mitigate impacts of secondary seismic hazards.

IV. DESIGN AND CONSTRUCTION (25%) – This area assesses the candidate’s ability to develop recommendations for site design, grading, remediation, and construction; to evaluate conformance to design specifications; and, to document and report as-built/as-graded conditions, including postconstruction monitoring.

<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
B. GRADING OBSERVATION AND CONSTRUCTION MONITORING (continued)	T44. Evaluate remedial grading excavations.	K124. Knowledge of the effect of rock properties on excavation methods. K20. Knowledge of landslide mechanics. K16. Knowledge of grading and excavation techniques. K12. Knowledge of geologic factors that affect various foundation types. K126. Knowledge of techniques to mitigate impacts of slope instability. K86. Knowledge of techniques to address unforeseen geologic conditions during construction. K46. Knowledge of methods to construct cut and fill slopes. K28. Knowledge of methods for construction and slope dewatering. K118. Knowledge of techniques to mitigate impacts of expansive soils. K41. Knowledge of methods of rock slope stabilization. K122. Knowledge of techniques to mitigate impacts of secondary seismic hazards. K55. Knowledge of methods to mitigate impact of compressible soils. K32. Knowledge of methods for in-place ground improvement. K64. Knowledge of methods to remediate contaminated soil.
C. MITIGATION AND REMEDIATION (3%)	T33. Develop erosion and sedimentation control plan.	K16. Knowledge of grading and excavation techniques. K46. Knowledge of methods to construct cut and fill slopes. K28. Knowledge of methods for construction and slope dewatering. K4. Knowledge of applications for different geotextiles and geofabrics. K32. Knowledge of methods for in-place ground improvement. K95. Knowledge of techniques to mitigate bluff instability and erosion along rivers and coastlines.

IV. DESIGN AND CONSTRUCTION (25%) – This area assesses the candidate’s ability to develop recommendations for site design, grading, remediation, and construction; to evaluate conformance to design specifications; and, to document and report as-built/as-graded conditions, including postconstruction monitoring.

<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
	T51. Identify methods for mitigating temporary and permanent slope instability.	K124. Knowledge of the effect of rock properties on excavation methods. K61. Knowledge of methods to mitigate impact of organic soils. K63. Knowledge of techniques for retaining wall construction. K20. Knowledge of landslide mechanics. K16. Knowledge of grading and excavation techniques. K126. Knowledge of techniques to mitigate impacts of slope instability. K86. Knowledge of techniques to address unforeseen geologic conditions during construction. K46. Knowledge of methods to construct cut and fill slopes. K73. Knowledge of relationship between strong ground shaking and slope stability. K28. Knowledge of methods for construction and slope dewatering. K100. Knowledge of techniques to mitigate effects of seismic slope instability. K118. Knowledge of techniques to mitigate impacts of expansive soils. K41. Knowledge of methods of rock slope stabilization. K122. Knowledge of techniques to mitigate impacts of secondary seismic hazards. K24. Knowledge of methods and materials for soil reinforcement. K4. Knowledge of applications for different geotextiles and geofabrics. K32. Knowledge of methods for in-place ground improvement. K95. Knowledge of techniques to mitigate bluff instability and erosion along rivers and coastlines.
D. POST CONSTRUCTION AND CONSTRUCTION REPORTING (4%)	T25. Design slope monitoring systems to evaluate depth and rate of slope movement.	K20. Knowledge of landslide mechanics. K12. Knowledge of geologic factors that affect various foundation types. K126. Knowledge of techniques to mitigate impacts of slope instability. K46. Knowledge of methods to construct cut and fill slopes. K73. Knowledge of relationship between strong ground shaking and slope stability. K118. Knowledge of techniques to mitigate impacts of expansive soils. K41. Knowledge of methods of rock slope stabilization. K95. Knowledge of techniques to mitigate bluff instability and erosion along rivers and coastlines.

IV. DESIGN AND CONSTRUCTION (25%) – This area assesses the candidate’s ability to develop recommendations for site design, grading, remediation, and construction; to evaluate conformance to design specifications; and, to document and report as-built/as-graded conditions, including postconstruction monitoring.

<i>Subarea</i>	<i>Job Task</i>	<i>Knowledge</i>
	T57. Prepare as-built geologic report to document actual geologic conditions encountered during construction.	<p>K6. Knowledge of effects of corrosive water and soil on engineered structures.</p> <p>K16. Knowledge of grading and excavation techniques.</p> <p>K77. Knowledge of state guidelines for preparing engineering geologic studies and reports.</p> <p>K12. Knowledge of geologic factors that affect various foundation types.</p> <p>K86. Knowledge of techniques to address unforeseen geologic conditions during construction.</p> <p>K118. Knowledge of techniques to mitigate impacts of expansive soils.</p> <p>K24. Knowledge of methods and materials for soil reinforcement.</p> <p>K4. Knowledge of applications for different geotextiles and geofabrics.</p> <p>K64. Knowledge of methods to remediate contaminated soil.</p> <p>K109. Knowledge of techniques to mitigate impacts of collapsible soils.</p> <p>K37. Knowledge of methods for onsite sewage disposal.</p> <p>K59. Knowledge of methods to mitigate impact of corrosive soils.</p>
	T71. Estimate relative potential for future surface displacement.	<p>K90. Knowledge of techniques to mitigate impacts of liquefaction.</p> <p>K20. Knowledge of landslide mechanics.</p> <p>K12. Knowledge of geologic factors that affect various foundation types.</p> <p>K73. Knowledge of relationship between strong ground shaking and slope stability.</p> <p>K100. Knowledge of techniques to mitigate effects of seismic slope instability.</p> <p>K41. Knowledge of methods of rock slope stabilization.</p> <p>K122. Knowledge of techniques to mitigate impacts of secondary seismic hazards.</p> <p>K95. Knowledge of techniques to mitigate bluff instability and erosion along rivers and coastlines.</p> <p>K109. Knowledge of techniques to mitigate impacts of collapsible soils.</p>